



REMARKS

Claims 1, 2, 4, and 6-23 are pending in the Application. Claims 1 and 18 are amended, and claims 8, 9, 12-17, and 23 are cancelled without prejudice or disclaimer. Applicants respectfully request reconsideration and allowance in view of the above amendments and the following remarks.

Initially, Applicants wish to thank the Examiner for the telephone interview conducted on August 20, 2001, which helped clarify the nature of the Examiner's outstanding rejections.

Rejections Under 35 U.S.C. § 112

Claims 1, 2, 4, and 6-23 are rejected under 35 U.S.C. § 112, first paragraph as containing subject matter not described in the specification in a manner such as to reasonably convey to one having skill in the art that the inventors had possession of the claimed invention at the time of the invention. In particular, the Examiner asserts that specifying that the boundary layer has an average sintered particle size that is different from the average sintered particle size of the adjacent layers does not have support in the specification because that language is broad enough to cover the situation in which the average sintered particle size of the boundary layer is smaller than that of the adjacent layers as well as larger than that of the adjacent layers, whereas only the situation in which the average sintered particle size of the boundary layer is larger than that of the adjacent layers is disclosed. Applicants have amended independent claims 1 and 18 to specify that the average sintered particle size of the boundary layer is larger than that of the respective adjacent layers (as claim 1 had specified previously).

The Office Action also rejects the subject claims under 35 U.S.C. § 112, first paragraph, on the basis that there is no support for the composition of the boundary layer being different from the composition of the insulating substrate layer, as recited, for example, in claim 11. Applicants note, however, that the Application specifies at page 6, lines 22-23 that the heterogeneous layer is made from "a material selected from the group of alumina, spinel, and steatite." Thus, the heterogeneous layer may, in fact, be made from a material other than alumina and hence, even though the disclosed embodiment on which the Examiner relies discloses the electrolytic substrate layer as being made from alumina, the specification provides support for heterogeneous layers that are made from other materials, i.e., that are of a different composition than the electrolytic substrate layer. Moreover, Applicants note that

even in the disclosed embodiment to which the Examiner refers, in which the heterogeneous layer is made from alumina as disclosed at page 9, lines 14-15, subsidiary materials include an acrylic resin and toluene. Thus, Applicants respectfully submit that the composition of the heterogeneous or boundary layer being different from that of the insulating substrate layer (which, as disclosed, is made from alumina) is clearly supported.

Finally, the Examiner asserts that there is no support for the claim limitation that the average sintered particle size of the heterogeneous layer is larger than the average sintered particle size of the insulating substrate layer. Applicants respectfully disagree. As originally filed, claim 1 recited "a plurality of substrate layers comprising at least one solid electrolytic substrate layer," and it further specified that the heterogeneous boundary layer is "interposed between said plurality of substrate layers." Claim 5, as originally filed, further limited that claim by specifying that "the heterogeneous boundary layer is interposed between a solid electrolytic substrate and an insulating substrate." Moreover, at page 13, lines 13 and 14, the Application specifically indicates that "the heterogeneous layer has [an average] sintering particle diameter larger than those of the neighboring substrate layers," and at page 4, lines 11-13 that "the heterogeneous boundary layer is interposed between a solid electrolytic substrate layer and an insulating substrate layer," i.e., has a solid electrolytic substrate layer and an insulating substrate layer as neighboring layers. Thus, from that combined disclosure, Applicants respectfully submit that the subject limitation -- that the average sintered particle size of the heterogeneous layer is larger than that of the neighboring insulating substrate layer -- is properly supported.

Moreover, Applicants note that this position is supported by Federal Circuit caselaw, namely, for example, Union Oil Co. of California v. Atlantic Richfield Co., 208, F.3d 989, 54 U.S.P.Q.2d 1227 (Fed. Cir. 2000). In that case, the Federal Circuit held that various claims to specific gasoline compositions (that reduced automobile tailpipe emissions) were not invalid for lack of written description, where those claims recited combinations of various gasoline parameters. The parameters were each individually disclosed, *per se*, or were disclosed as falling within a particular range, but no single embodiment (i.e., example) was disclosed as possessing the specific claimed combination of parameters. As the Federal Circuit instructed, "the written description requirement does not require identical descriptions of claimed compounds, but it requires enough disclosure in the patent to show one of skill in this art that the inventor 'invented what is claimed', relying on Vas-Cath Inc. v. Mahurkar, 935 F.2d 5055, 1563 (Fed. Cir. 1991). Thus, Applicants respectfully submit that the subject

limitation is, in fact, properly supported by the disclosure, and therefore Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103

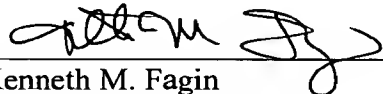
Claims 1, 2, 4, and 6-23 are again rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Mase et al., U.S. Patent No. 4,861,456 in view of Suzuki et al., U.S. Patent No. 4,177,112. According to the Office Action, the subject claims "differ [from Mase et al.] by calling for the boundary layer to have an average sintered particle size larger than...those of the electrolyte layer and the insulating layer." According to the Office Action, however, "it would have been obvious for Mase to use larger particles in the boundary layer[.]" which is interpreted as being the porous alumina or spinel insulation layer 20 (see column 6, lines 50-68), "in order to obtain a more porous layer in view of Suzuki," on which, the Examiner explained in the recent telephone interview, the Examiner is relying for its alleged disclosure of a correlation between porosity and particle size. Applicants respectfully traverse this rejection for the reasons already of record throughout prosecution of this Application.

Moreover, as was noted during the recent telephone interview, the particle size of the boundary layer "starts off" smaller than the particle size of the adjacent substrate layers, but that relationship reverses during the sintering process. (See pages 6, 8, and 9, where it is disclosed that initially the heterogeneous layer has an average particle diameter of 0.3 micrometer which is smaller than the average particle diameter of the electrolytic substrate layer, which is 0.5 micrometer, but after sintering, the average particle diameter of the heterogeneous layer (3-4 micrometer) is larger than the average sintered particle diameter (2-3 micrometer) of the substrate layer.) Thus, the relationship between the average sintered particle diameter cannot be predicted from the relationship between the average particle diameter of starting materials, and certainly no prediction can be made as to the relationship between average sintered particle diameters based on Suzuki's disclosure of relative vapor deposited particle diameters. Accordingly, Applicants respectfully submit that one having skill in the art would not have been led to achieve the claimed invention by considering Mase in view of Suzuki. Accordingly, Applicants respectfully request that the rejection be withdrawn.

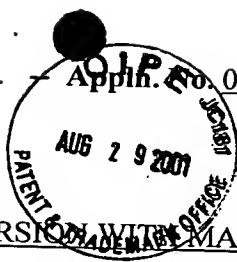
In view of the foregoing, Applicants respectfully submit that all remaining claims are in condition for allowance and timely Notice to that effect is respectfully requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

Respectfully submitted,
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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE CLAIMS:

1. (Six times amended) A multilayered air-fuel ratio sensor having a plurality of stacked layers comprising:

a plurality of substrate layers comprising at least one solid electrolytic substrate layer and at least one insulating substrate layer; and

a boundary layer interposed between said solid electrolytic substrate layer and said insulating substrate layer;

wherein said boundary layer has an average sintered particle size that is [different from] larger than that of said solid electrolytic substrate layer and that is [different from] larger than that of said insulating substrate layer.

18. (Amended) A multilayered air-fuel ratio sensor having a plurality of stacked layers comprising:

a plurality of substrate layers comprising at least one solid electrolytic substrate layer and at least one insulating substrate layer; and

a boundary layer interposed between said solid electrolytic substrate layer and said insulating substrate layer;

wherein said boundary layer has an average sintered particle size that is larger than that of said solid electrolytic substrate layer and that is [different from] larger than that of said insulating substrate layer and wherein the composition of said boundary layer is different from the composition of said solid electrolytic substrate layer.